

Welcome to the latest of the research updates from the Joint Centre for Disaster Research (JCDR). The centre opened in December 2006 and is a joint venture between Massey University and GNS Science within the School of Psychology, based at the Massey University campus in Wellington.

The centre undertakes multi-disciplinary applied teaching and research aimed at:

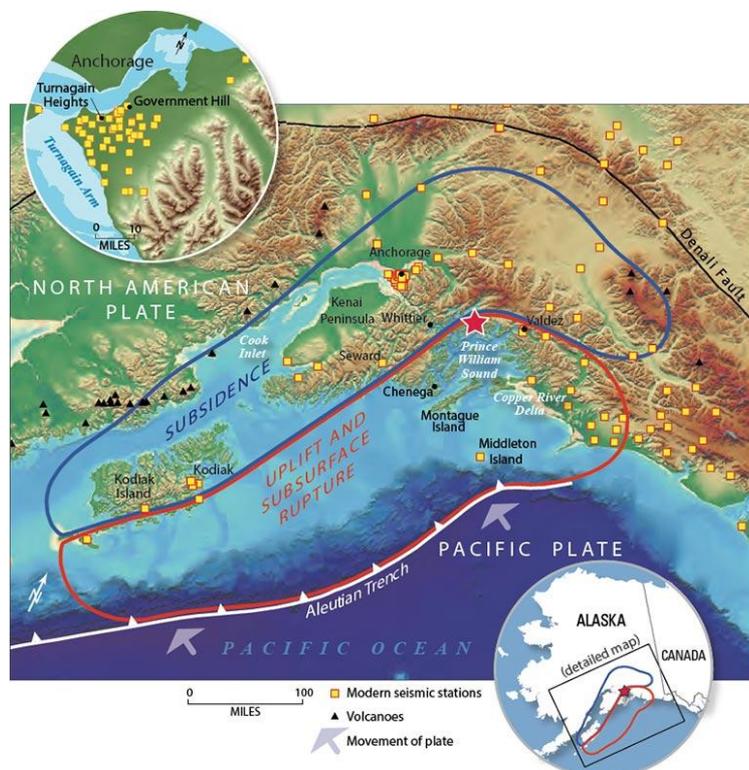
- gaining a better understanding of the impacts of natural, man-made, and environmental disasters on communities;
- improving the way society manages risk;
- enhancing community preparedness, response to and recovery from the consequences of natural, man-made and environmental hazard events.



From 2012 the JCDR became an International Centre of Excellence of the Integrated Research on Disaster Risk (IRDR) Programme. The ICoE is one of a network of Centres of Excellence launched by the IRDR programme of the United Nations International Strategy for Disaster Reduction (UN-ISDR), International Council for Science (ICSU) and the International Social Science Council (ISSC).

Visit our updated website: <http://disasters.massey.ac.nz/>

Learning lessons from the past – the 1964 Alaskan earthquake



On March 27, 1964 at 5:36pm local time a great earthquake of magnitude 9.2 occurred in the Prince William Sound region of Alaska. The earthquake rupture started approximately 25 km beneath the surface, with its epicentre about 90 km west of Valdez and 75 miles 120 km east of Anchorage. The earthquake lasted approximately 4.5 minutes and is the most powerful recorded earthquake in U.S. history. It is also the second largest earthquake ever recorded, next to the magnitude 9.5 earthquake in Chile in 1960. Much has been learnt from this event 50 years ago and it gives us insights as to the range of potential impacts of a future East Coast New Zealand earthquake.

<http://pubs.usgs.gov/fs/2014/3018/pdf/fs2014-3018.pdf>

The map shows the epicentre of the 1964 Great Alaska Earthquake (red star), caused when the Pacific Plate lurched northward underneath the North American Plate (Source USGS).

News from the JCDR Team

Congratulations to our recently successful PhD students! **Robyn Tuohy** successfully defended her PhD thesis in June. Robyn's thesis is titled, "Disaster preparedness of older adults in New Zealand". She was supervised by Chris Stephens, David Johnston, and Jocelyn Handy. Also in June, **Sally Potter** successfully defended her PhD thesis in emergency management. The thesis, titled "Communicating the status of volcanic activity in New Zealand, with specific application to caldera unrest", was accepted onto the Massey University Deans List of Exceptional Theses. Her supervisors were David Johnston, Vince Neall, and Gill Jolly. Sally is now a postdoctoral fellow at JCDR, based at GNS Science in Avalon. In September, **Vicki Johnson** successfully defended her PhD thesis in emergency management. The thesis, titled "Evaluating disaster programmes for children", was passed without emendations. Her supervisors were David Johnston, Robin Peace, and Kevin Ronan.

The Centre welcomes two new PhD students. **Alan Kwok** working on a project titled *Measuring and Mapping Disaster Resilience in Local Communities: A Multi-layered Comparative Analysis between New Zealand and the U.S.* and **Hayley Squance** on *Animal Welfare Emergency Management: Management of animals during and after national disasters in New Zealand*. Hayley is a member of the University's Veterinary Emergency Response Team.



Photo right: Alan Kwok



Photo left: Hayley second on the left.

Wendy Saunders was a Judge of the 2014 Zonta Science Award.

Cassie Kenney was invited by the (Ministry of Health) Taiwanese Government and Pingtung National University of Science and Technology to present a plenary address at the New Directions in Disaster Recovery and Reconstruction: Livelihoods, Resilience and Sustainability Conference in Taiwan.

Stuart Fraser is now the Disaster Risk Management Specialist at GFDRR Labs, World Bank Group. Stuart is awaiting his PhD defence planned for October.

The Centre has hosted PhD Student **Fatima Razeghi** from the School of Architecture & Urban Planning, Shahid Beheshti University of Iran for three months (July-September).

Sarb Johal and **David Johnston** are continuing to work with CERA and have had input into The Community in Mind webpage on the CERA website. The page features background information about Community in Mind, links to the key documents and opportunities for people to request Conversations that Connect and to submit their stories of resilience. This page is available at <http://cera.govt.nz/communityinmind/>

Six staff members were invited as delegates to the Integrated Research on Disaster Risk (IRDR) Conference, in Beijing, China, from 7th - 9th June 2014. The JCDR delegates were: **Emma Hudson-Doyle, Cassie Kenney, Suzanne Phibbs, Wendy Saunders, David Johnston and Thomas Huggins**. Each of these delegates was invited to present findings from their own research. More information on this conference can be found later in the newsletter.

Indigenous focus at UN Samoa conference

A Massey University forum on indigenous approaches to reducing disaster risk held in Samoa in September has been praised by the Samoan Head of State. The university's Pacific Research and Policy Centre and the Joint Centre for Disaster Research hosted the parallel event at the third United Nations Small Island Developing States conference (SIDS) in Samoa.



Photo: (from left): Pene Lefale (Affiliate of the Joint Centre for Disaster Research), Litea Meo-Sewabu (Coordinator Pacific Research and Policy Centre), Christine Kenney (Joint Centre for Disaster Research), Tui Atua Tupua Tamasese Efi (Head of State Samoa), Associate Professor Malakai Koloamatangi (Co-director Pacific Research and Policy Centre), Tuatagaloa Jo Annandale, Siautu Alefaio-Tugia (School of Psychology).

The session – attended by more than 50 people – was commended by Samoa's Head of State, Tui Atua Tupua Tamasese Efi. "It was the only panel in the entire conference that deliberately promotes, by emphasis and language, the indigenous aspects," he says. Indigenous knowledge in the context of disaster risk reduction and emergency planning includes such things as reading weather and ocean signs and interpreting changes in how plants respond to climate change, as well as the use of local organic materials instead of tin and iron in buildings to minimise injuries during a natural disaster. As a follow up to the event the two research centres have joined forces to offer a one-day workshop on indigenous approaches to disaster risk reduction next March. Participants will have the opportunity to develop their own crisis planning, and identify organisations they need to work with to ensure indigenous approaches are part of disaster risk reduction.

Co-director of the Pacific Research and Policy Centre, Associate Professor Malakai Koloamatangi says indigenous approaches to disaster risk reduction and social resilience are often poorly represented in regional and national emergency response, and disaster management policy and plans. "The follow-up workshop is designed to highlight this policy gap in the disaster management strategies of small island developing states," he says. "We want to draw attention to the ways such knowledge and practices might be adapted to shape disaster response frameworks, inform local and national governance, and facilitate regional initiatives."

This United Nations global general assembly for sustainable development of Small Island Developing States (SIDS) began in Barbados in 1994 with the Barbados Programme of Action, followed by the second SIDS general assembly in Mauritius in 2005, which resulted in an implementation plan called the Mauritius Strategy. A draft outcome of this third conference is the S.A.M.O.A Pathway (Small Island Developing States Accelerated Modalities of Action) that incorporates considerations for the United Nations Millennium Development Goals post-2015. (Story from Massey News.)

Academic visitor to Loughborough University, UK

Recently Dr Raj Prasanna was invited to be an academic visitor by the School of Business and Economics, Loughborough University, UK. Raj visited the UK during the 21st August - 9th September and met the team leaders of the Emergency Management Research Interest Group, Centre for Service Management, Centre for the Study of International Governance and the Loughborough Design School to discuss possibilities of conducting collaborative research in Disaster Management. During his visit, Raj conducted a workshop for the PhD students, at the Loughborough University, on how to conduct research in emergency management and gave an open presentation on the topic of *Emergency & Service Management in NZ: Moving on from Christchurch Earthquakes*. During his visit he was invited to meet the emergency management teams across the East Midlands region including Leicestershire, Nottinghamshire and Derbyshire county councils. Raj visited the Regional Fire and Rescue Service Control Centre in the East Midlands and had initial discussions with the Leicestershire fire service about conducting a longitudinal study in collaboration with Loughborough University on the implementation of a new fire incident command information system, the Electronic Incident Management System, which is about to be launched in the East Midlands region in early 2015.

Photo right: Raj with Dr. Lili Yang Team Leader Emergency Management Research Interest Group, Loughborough University.

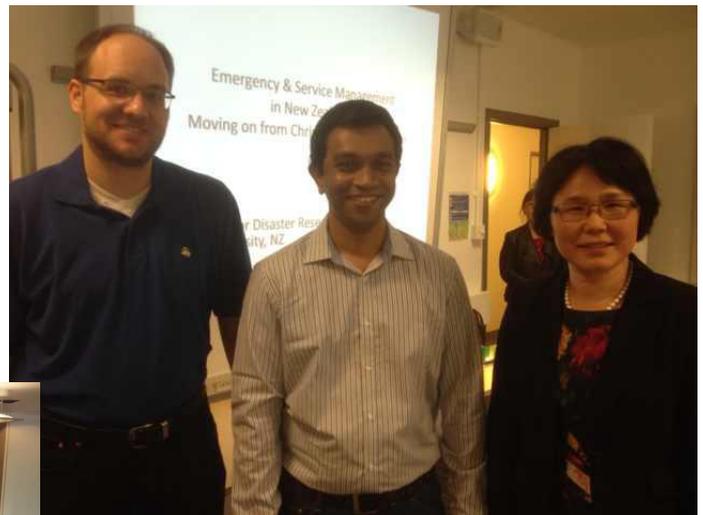


Photo left: Raj with the Members of the Communications and Technology team at the Leicestershire Fire and Rescue Service.

Photo right: Raj with the Head of Emergency Management Nottinghamshire County Council.



2nd Integrated Research on Disaster Risk Conference – Integrated Disaster Risk Science: A tool for sustainability

Organised by the Integrated Research on Disaster Risk Programme and China Association for Science and Technology <http://www.irdrinternational.org/conference-2014/>

Introduction and context: The Integrated Research on Disaster Risk (IRDR) Programme, in partnership with the China Association for Science and Technology (CAST), hosted the 2nd Integrated Research on Disaster Risk Conference from 7th - 9th June 2014 in Beijing, China (ICSU, 2008). The theme was Integrated Disaster Risk Science: A Tool for Sustainability, and the conference placed emphasis on the importance of science as a tool to address hazard risks, integration and partnership. A key cross-session discussion considered the influence of science in the Hyogo Framework for Action (HFA2) amid preparations for the World Conference on Disaster Risk Reduction (WCDRR) in Japan.



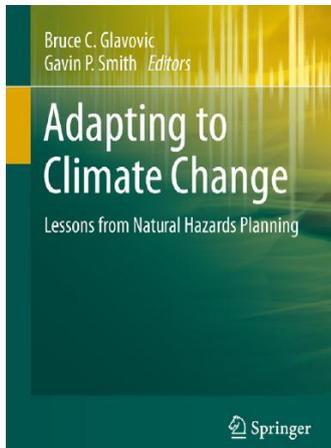
The IRDR programme is a ten-year research initiative. The IRDR office is funded by the China Association for Science and Technology (CAST), and hosted at the Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Science (CAS). Research and project funds come from a variety of international sources. The conference was co-organized by the China International Conference Center for Science and Technology (CICCST), IRDR China National Committee, International Council for Science (ICSU), the International Social Science Council (ISSC), and the United Nations International Strategy for Disaster Reduction (UN-ISDR). The event was sponsored by the International Journal of Disaster Risk Science and the CAS, through RADI.

Conclusion: An issue that was prevalent throughout the event was the need for more integrated approaches. This includes natural and social science integrations; integration of science into policy and practices; as well as the integration of non-traditional knowledge and information into science, policy and practice. The disaster risk reduction community needs to find ways to adopt such an integrated approach to bridge the current gaps between science, policy, and practice. As a community, disaster risk reduction researchers, academics, policy makers and practitioners, need to rapidly contribute to global initiatives including the post-2015 framework for disaster risk reduction (March 2015); sustainable development goals (September 2015); and climate change agreements through UNFCCC (December 2015). This needs to be accomplished through the integration of disaster risk reduction into the new Sustainable Development Goals. This is similar to how disaster risk reduction is embedded in the Intergovernmental Panel on Climate Change (IPCC) process, and we would like to see the same outcome in the context of the Sustainable Development Goals. Therefore a key message from this IRDR 2014 conference is the urgent need to have disaster risk reduction included explicitly in the draft of the Sustainable Development Goals including the interrelationship with Hyogo Framework for Action and the Hyogo Framework for Action 2.

Rovins, J. E., Doyle, E. E. H. & Huggins, T. J. (2014): 2nd Integrated Research on Disaster Risk Conference - Integrated Disaster Risk Science: A tool for sustainability. In: *Planet@Risk*, 2(5), Special Issue for the Post-2015 Framework for DRR: p. 332-336, Global Risk Forum GRF Davos, Davos.

New book entitled **Adapting to Climate Change: Lessons from Natural Hazards Planning**

The launch of a new book entitled *Adapting to Climate Change: Lessons from Natural Hazards Planning* co-edited by Bruce Glavovic (Massey University) and Gavin Smith (University of North Carolina) was held on the 14th of August, from 5:30 - 7:00pm at Massey University's Great Hall in Wellington.



This book identifies lessons learned from natural hazard experiences to help communities plan for and adapt to climate change. Written by leading experts, the case studies examine diverse experiences, from severe storms to sea-level related hazards, droughts, heat waves, wildfires, floods, earthquakes and tsunami, in North America, Europe, Australasia, Asia, Africa and Small Island Developing States. The lessons are grouped according to four imperatives: (i) Develop collaborative governance networks; (ii) build adaptive capabilities; (iii) invest in pre-event planning; and (iv) the moral imperative to undertake adaptive actions that advance resilience and sustainability. The book includes contributions by New Zealand experts, including Michele Daly (GNS) and Iain White (Waikato), and case studies from New Zealand, Australia and the Pacific islands amongst others.

“This book represents a major contribution to the understanding of natural hazards planning as an urgent first step for reducing disaster risk and adapting to climate change to ensure sustainable and equitable development”, Sálvano Briceño, Vice-Chair, Science Committee, Integrated Research on Disaster Risk IRDR, an ICSU/ISSC/ISDR programme. Former Director International Strategy for Disaster Reduction, UNISDR.

Integrating the effects of flood experience on risk perception with responses to changing climate risk

Flood management decision-makers face significant challenges as the climate changes. The perceptions of those affected by floods are critical to the successful implementation of adaptation responses; risk perceptions are affected by how information is communicated and, in turn, perceptions influence expectations on flood risk managers to respond. The links between flood experience, risk perception, and responses by individual households were examined in the Hutt Valley, New Zealand, through a household survey, a workshop and interviews with local government practitioners. Two propositions were tested: (1) that flood experience can influence flood risk perceptions; and (2) that flood experience can stimulate increased risk reduction and adaptation actions where changing climate risk is likely. Perceptions of responsibility for flood management were also examined.



The study found that previous flood experience contributes to heightened perception of risk, increased preparedness of households, greater willingness to make household-level changes, greater communication with councils, and more advocacy for spatial planning to complement existing structural protection. Flood-affected households had a stronger preference for central government and communities having flood risk responsibilities, in addition to local government. Those who lacked experience were more likely to be normalised to their prior benign experiences and thus optimistic about flood consequences. These results suggest that harnessing positive aspects of experience and communication of changing risk through engagement strategies could help shift the focus from citizens' expectation that governments will always provide protection, to a citizen–local government–central government dialogue about the changing character of flood risk.

Lawrence, J., Quade, D., & Becker, J. (in press). Integrating the effects of flood experience on risk perception with responses to changing climate risk. *Natural Hazards*.

Six case studies of risk management approaches to natural hazard risk reduction in land-use planning

Since the Canterbury earthquakes (2010–2011), there have been calls from numerous sources to better manage risks from natural hazards in New Zealand. Land use planning is one tool available to achieve this, governed by the Resource Management Act 1991 (RMA). This recently report provides six case studies of risk management approaches to natural hazard risk reduction. The cases focus on the Port Hills recovery in Christchurch; the collaborative approach to flood management in Thames; how scientific advice contributed to improving the outcomes of Proposed Plan Change 29: Proposed zoning change to the western end of Petone; the SPUR earthquake initiative in San Francisco; Queensland flood management; and flood and hazardous installation management in the UK. Based on the case studies, recommendations for improving risk reduction in land use planning are based on five critical success factors: legislation, leadership, collaboration, information and education, and managed retreat. These recommendations are summarised below:



Legislation

- As outlined in the proposed RMA reforms (Ministry for the Environment, 2013a, 2013b), provisions should be strengthened so that risks from natural hazards are reduced, rather than the current requirement to consider just the hazard;
- Increase the integration and implementation between legislation, i.e., the Resource Management Act (RMA), Building Act, Civil Defence Emergency Management (CDEM) Act, and Earthquake Commission (EQC) Act, to improve information sharing and consistent policy frameworks;
- Ensure that land use planning is at the forefront of risk management – i.e., preventing consequences rather than having to recover from them. This requires a focus on long term risk reduction initiatives.

Leadership

- Strategic national leadership – and subsequent „ownership“ – of risk reduction is needed. It is recommended that further investigations are undertaken to assess which agency would be best placed to assume this role, e.g., MfE or MCDEM via the Department of Prime Minister and Cabinet?
- A national risk reduction FTE position should be investigated, to provide national level support for reducing risks to natural hazards.
- That regions or districts work together to form a „risk reduction group“ to encourage engagement between insurers, key infrastructure providers, planners, emergency managers, community groups (including iwi) and other agencies (e.g., Department of Conservation (DOC)) on key risk reduction initiatives. This could be in conjunction with regional Civil Defence Emergency Management Group activities.

Information and education

- Increase professional development opportunities to allow planners the opportunity to increase their awareness of natural hazard issues (including of cascading and cumulative natural hazards);
- That the “Making Good Decisions” programme for RMA decision makers includes a module on managing natural hazards and risks; and
- Comprehensive documentation of pre- and post-event land use planning lessons from Christchurch. This could also extend to lessons from other natural events.
- Collaboration
- Providers of scientific knowledge are funded and supported to be more involved in local planning issues; and
- Involve key stakeholders (e.g., EQC, private insurers, NZTA, lifeline utilities, LGNZ, etc.) in the development of national risk reduction policies.

Managed retreat

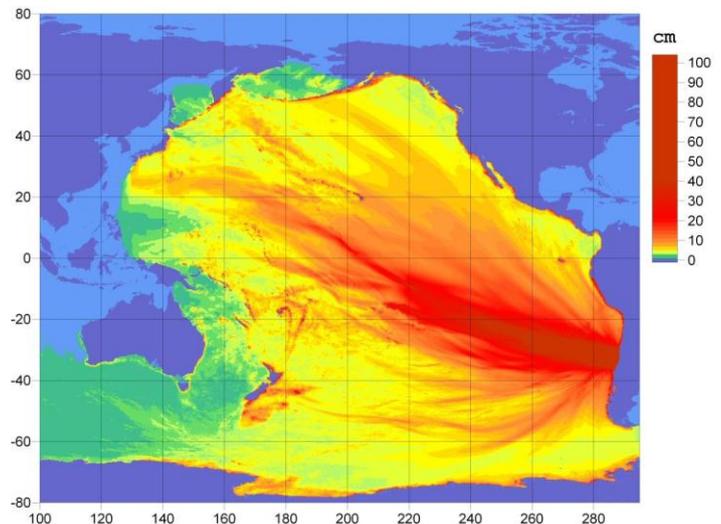
- That central government investigate whether a change in legislation is required to provide a framework and support for managed retreat.
- That guidance or national direction – with examples – of successful managed retreat is developed, with regulatory and non-regulatory frameworks provided.

Saunders, W. S. A., Beban, J. G., Taig, T., Morris, B., Mieler, D. H., & Massey, C. I. 2014. Case studies on national and international approaches to risk reduction through land use planning, GNS Science Report 2014/46. 67 p.

Evidence-based support for the characteristics of tsunami warning messages for local, regional and distant sources

Many studies since 2004 have documented the dissemination and receipt of risk information for local to distant tsunamis and factors influencing people's responses. A few earlier tsunami studies and numerous studies of other hazards provide additional support for developing effective tsunami messages. This study explores evidence-based approaches to developing such messages for the Pacific and National Tsunami Warning Centers in the US. It extends a message metric developed for the NWS Tsunami Program.

People at risk of tsunamis receive information from multiple sources through multiple channels. Sources are official and informal and environmental and social cues. Traditionally, official tsunami messages followed a linear dissemination path through relatively few channels from warning center to emergency management to public and media. However, the digital age has brought about a fundamental change in the dissemination and receipt of official and informal communications. Information is now disseminated in very non-linear paths and all end-users may receive the same message simultaneously.



Research has demonstrated factors that influence rapid response to an initial real or perceived threat, but this behavior is less common than one involving delayed protective actions where people first seek to confirm information before taking protective action. These factors range from the content and style of the message to characteristics of the receiver. While warning centers have short-term control over message style and content, the same is not so for characteristics of receivers, which is developed as a social-behavioral and cultural process over long time spans. We developed a tsunami message metric consisting of 21 factors divided into message content and style and receiver characteristics. Initially, each factor was equally weighted to identify gaps, but here we extend the work by weighting specific factors. This illuminates the most important determinants of protective action as described in warning systems literature. We discuss the prioritization of information in the context of potentially limited space in evolving tsunami messages issued by the warning centers.

Gregg, C.E., Sorensen J., Vogt-Sorensen, B., & Johnston, D.M. (2014). Recommended Revisions to Warning Product Prototypes of the NWS National Tsunami Warning Center. Report for NWS National Tsunami Warning Center, Palmer, Alaska.

Improving understandings about disaster preparedness for independent older adults in the community

Older adults are a population group identified to be at greater risk to negative outcomes in a disaster. However, there is limited contemporary research about independent older adults' disaster preparedness from an age specific perspective. The Canterbury earth- quakes, which occurred in New Zealand, provided an opportunity to conduct 10 qualitative narrative interviews with a sample of participants aged between 66 and 86 years. Thematic analysis assisted in coding and interpretation of patterns across the dataset, and three central themes were identified: personal protection, practical preparedness, and social preparedness. The findings provide future practical direction for age specific preparedness planning during non-disaster times, which will also assist with improving outcomes for independent older adults during and after a disaster event.

Tuohy, R., Stephens, C., & Johnston, D. (2014). Qualitative research can improve understandings about disaster preparedness for independent older adults in the community. *Disaster Prevention and Management* 23: 296-308.

Evaluations of disaster education programmes for children: A methodological review

The purpose of this methodological literature review was to investigate how scholars and practitioners currently measure and judge the effectiveness of disaster education programs for children through evaluation. From a systematic search of the published and grey literature, 35 studies were identified and analysed to develop a categorization of the operational components of the existing body of research, including the types and sources of evaluations, research methods and designs, research participants, outcome indicators, approaches to analysis, and research limitations. A significant finding is that most of what is known about the effectiveness of disaster education programs for children is based on the results of quantitative studies with children that generally focused on measuring children's knowledge of disaster risks and protective actions and child reports of preparedness actions. The majority of descriptive and quasi-experimental studies concluded that programs were effective based on the portion or positive change in children's correct answers on surveys, and most correlational studies concluded positive outcomes such as household preparedness were associated with children's participation in disaster education programs. However, many of the studies had significant methodological limitations. While there is evidence of valuable knowledge change, there is still very limited empirical evidence of how disaster education programs facilitate children's roles in household preparedness, their self-protective capacities, or their likelihood of preparing for disasters as adults. In addition to the need to identify and refine program theory and meaningful outcome indicators, the authors suggest several other opportunities for future research.

Johnson, V.A., Kevin R. Ronan, K.R., Johnston, D.M., Peace, R. (2014). Evaluations of disaster education programs for children: A methodological review. *International Journal of Disaster Risk Reduction* 9: 107-123.

Assessing the national implementation of disaster preparedness education in New Zealand primary schools through the dissemination of What's the Plan, Stan?

The purpose of the research is to assess the national implementation of disaster preparedness education in New Zealand primary schools through the dissemination of What's the Plan, Stan?, a voluntary, curriculum-based teaching resource. Results and findings from a focus group study with school teachers and local civil defence staff in 2011 and a nationally representative survey of schools in 2012 were analysed to identify intervening, facilitating and deterrent factors of uptake and use of the resource.

The main intervening factors between resource promotion and school teachers' awareness of the resource are word of mouth among school teachers and their proactive lesson plan research. The strongest facilitating factor was school-wide use of the resource. Lack of awareness of the resource and the perceived need for teacher training are the greatest deterrents to the use of the resource. Based on the findings, several recommendations are provided for increasing use of the resource including use of web-based technology for teacher training, integration of disaster preparedness messaging into other children's programs, ongoing evaluation and curriculum requirements.

An evaluation of the implementation of What's the Plan, Stan? adds to the limited body of knowledge on the benefits and challenges to distributing a voluntary teaching resource as a national strategy for curriculum integration of disaster education. The findings and lessons are relevant for nations meeting the Core Indicators of progress toward the 2005-2015 Hyogo Framework For Action.



Johnson, V.A., Kevin R. Ronan, K.R., Johnston, D.M., & Peace, R. (in press). Implementing disaster preparedness education in New Zealand primary schools. *Disaster Prevention and Management*.

Exploring the causes of injury during the 2010/2011 Canterbury earthquakes

The aim of this study was to investigate causes of injury during the 2010/2011 Canterbury earthquakes. Data on patients injured during the Darfield (4th September 2010) and Christchurch (22th February 2011) earthquakes were sourced from the New Zealand Accident Compensation Corporation. The total injury burden was analyzed for demography, context of injury, causes of injury, and injury type. Injury context was classified as direct (shaking of the primary earthquake or aftershocks causing unavoidable injuries), action (movement of person during the primary earthquake or aftershocks causing potentially avoidable injuries), and secondary (cause of injury after shaking ceased). Nine categories of injury cause were identified. Three times as many people were injured in the Christchurch earthquake as in the Darfield earthquake (7,171 vs. 2,256).

The primary shaking caused approximately two-thirds of the injuries from both quakes. Actions during the primary shaking and aftershocks led to many injuries (51.3 % Darfield and 19.4 % Christchurch). Primary direct caused the highest proportion of injuries during the daytime Christchurch quake (43.6 %). Many people were injured after shaking stopped in both events: 499 (22.1 % Darfield) and 1,881 (26.2 % Christchurch).



Most of these people were injured during clean-up 320 (14.2 % Darfield; 622 (8.7 % Christchurch). In both earthquakes, more females than males (1,453 vs. 803 Darfield; 4,646 vs. 2,525 Christchurch) were injured (except by masonry, damaged ground, and during clean-up); trip/fall (27.9 % Darfield; 26.1 % Christchurch) was the most common cause of injury; and soft tissue injuries (74.1 % Darfield; 70.4 % Christchurch) was the most common type of injury. This study demonstrated that where people were and their actions during and after earthquakes influenced their risk of injury.

Johnston, D., Standring, S., Ronan, K., Lindell, M., Wilson, T., Cousins, J., Aldridge, E., Ardagh, M., Deely, J., Jensen, S., Kirsch, T., & Bissell, R. (2014 in press). The 2010/2011 Canterbury Earthquakes: context and cause of injury. *Natural Hazards*.

The power to react: review and discussion of Canada's emergency measures legislation

Almost a century ago Canada implemented the War Measures Act to give the federal government extraordinary powers to deal with the domestic implications of the First World War. The government further expanded and institutionalised these powers through the Second World War, the Korean crisis and the cold war period. Now these war emergency powers are entrenched in both federal and provincial emergency measures legislation and exercised for peacetime disasters. This paper reviews the historical progression of these powers to better understand the original context for their development and to connect past abuses of civil rights under the War Measures Act to the protections and limits incorporated in the current legislation. Then, based on this understanding of where the powers originated, the paper takes a comprehensive look at the powers available across the Canadian jurisdictions. It identifies common groups of powers and discusses regional variations. It concludes with a short discussion on the imbalance between extraordinary powers for response and the lack of a corresponding emphasis on reducing the risks that may generate the need for them.

Lindsay, J. (2014). The power to react: review and discussion of Canada's emergency measures legislation. *The International Journal of Human Rights*, 18:2, 159-177, doi: 10.1080/13642987.2014.889392

Communicating the status of volcanic activity in New Zealand, with specific application to caldera unrest

Volcanic eruptions can negatively impact social, economic, built, and natural environments. Volcano Early Warning Systems (VEWSs) assist with mitigating the risk of eruptions. Volcanic Alert Level (VAL) systems are a component of VEWSs and are commonly used to communicate the status of volcanic activity. Volcanic unrest, which may consist of seismicity, deformation, degassing, and geothermal changes, is a status often used in communicating warnings as it is the key indicator of an impending eruption. However, it can be difficult to distinguish between „background“ activity and „unrest“. This research focuses on recognising changes at a caldera volcano when it begins to show signs of unrest, and the communication of this information using the VAL system.

New Zealand’s VEWS is summarised and the VAL system is explored. Influences on the determination of the VAL and potential foundations of VAL systems are identified. For the first time globally a qualitative ethnographic methodology is used to develop a new VAL system, involving interviews, observations over three years, and document analysis. To assist with distinguishing „unrest“ from „background“ activity at volcanoes, a new, innovative tool called the Volcanic Unrest Index (VUI) was developed. The VUI is a semi-quantitative tool that defines unrest and integrates multi-parameter qualitative and quantitative data, enabling a world-first comparison of the intensity of unrest. It provides a simple way to communicate the status of a volcano with non-scientists. A catalogue of historical caldera unrest was developed for Taupo Volcanic Centre (TVC), New Zealand. Through estimating the VUI, 16 episodes of unrest between 1872 and 2011 were identified, with a recurrence rate of one episode every nine years, and a median duration of slightly less than five months. Socio-economic impacts have resulted from many of these unrest episodes.

These findings suggest the VAL could have been raised during past unrest at TVC, including in 2008-10. However, influences on the decision to change the VAL, including potential socioeconomic impacts, may cause a delay in raising the VAL during future unrest. These findings contribute towards more effective communication of the status of volcanoes in New Zealand in the future, particularly at calderas.

New Zealand Volcanic Alert Level System			
Volcanic Alert Level	Volcanic Activity	Most Likely Hazards	
Eruption	5	Major volcanic eruption	Eruption hazards on and beyond volcano*
	4	Moderate volcanic eruption	Eruption hazards on and near volcano*
	3	Minor volcanic eruption	Eruption hazards near vent*
Unrest	2	Moderate to heightened volcanic unrest	Volcanic unrest hazards, potential for eruption hazards
	1	Minor volcanic unrest	Volcanic unrest hazards
	0	No volcanic unrest	Volcanic environment hazards

An eruption may occur at any level, and levels may not move in sequence as activity can change rapidly.

Eruption hazards depend on the volcano and eruption style, and may include explosions, ballistics (flying rocks), pyroclastic density currents (fast moving hot ash clouds), lava flows, lava domes, landslides, ash, volcanic gases, lightning, lahars (mudflows), tsunamis, and/or earthquakes.

Volcanic unrest hazards occur on and near the volcano, and may include steam eruptions, volcanic gases, earthquakes, landslides, uplift, subsidence, changes to hot springs, and/or lahars (mudflows).

Volcanic environment hazards may include hydrothermal activity, earthquakes, landslides, volcanic gases, and/or lahars (mudflows).

*Ash, lava flow, and lahar (mudflow) hazards may impact areas distant from the volcano.

This system applies to all of New Zealand’s volcanoes. The Volcanic Alert Level is set by GNS Science, based on the level of volcanic activity. For more information, see geonet.org.nz/volcano for alert levels and current volcanic activity, gns.cri.nz/volcano for volcanic hazards, and getthru.govt.nz for what to do before, during and after volcanic activity. Version 3.0, 2014.

Figure: New Zealand’s new Volcanic Alert Level system, developed during this research.

Potter, S. H. (2014). Communicating the status of volcanic activity in New Zealand, with specific application to caldera unrest. Ph.D. thesis, Massey University, Wellington, New Zealand.

Teaching and outreach

Staff and associates of JCDR currently contribute to elements of the Graduate Diploma in Emergency Management and MA, MPhil and PhDs in psychology, emergency management and other related disciplines. The centre also plans to work with other organisations in the provision of training within the civil defence emergency management sectors. A series of emergency management short courses are organised by the centre in summer and spring.

Graduate students – linked to the Centre

Massey University

Sara McBride (PhD student, School of Psychology, Massey University)

“The Canterbury Tales: Learnings from the Canterbury Earthquake Sequence in New Zealand to design successful public education campaigns to increase community resilience for low risk and high impact areas in Washington State, United States of America”.

Tom Huggins (PhD student, School of Psychology, Massey University)

“Optimising visual solutions for complex strategic scenarios”.

Stuart Fraser (PhD student, School of Psychology, Massey University)

“The potential for using mid to high-rise buildings as vertical evacuation structures in near-source earthquake and tsunami events”.

Jack Lindsay (PhD student, School of Psychology, Massey University)

“Maximising participatory planning in emergency management: implications for professional practice”.

Robyn Tuohy (PhD student, School of Psychology, Massey University)

“Disaster preparedness of older adults in New Zealand”.

Alan Kwok (PhD student, School of Psychology, Massey University)

“Measuring and mapping disaster resilience in local Communities: A multi-layered comparative analysis between New Zealand and the U.S.”.

Hayley Squance (PhD student, School of Psychology, Massey University)

“Animal Welfare Emergency Management: Management of animals during and after national disasters in New Zealand”.

Sally Potter (PhD student, School of Psychology, Massey University)

“Communicating the status of volcanic activity in New Zealand, with specific application to caldera”.

Vicki Johnson (PhD student, School of Psychology, Massey University)

“Evaluating disaster education programs for children”.

Karlene Tripler (PhD student, School of Psychology, Massey University)

“Emergency management in New Zealand primary schools”

Maureen Mooney (PhD student, School of Psychology, Massey University)

“Childhood and caregiver post-disaster recovery following Canterbury earthquakes of 2010 and 2011”.

Gavin Treadgold (Masters student, School of Psychology, Massey University)

“Information management for post-disaster building assessment”.

Sylvia Tapuke (Masters student, School of Psychology, Massey University)

“Ways in which waiata may be showcased as culturally relevant tools for facilitating disaster risk perception, management and recovery”.

Paul Schneider (PhD student, Institute of Development Studies School of People, Environment and Planning, Massey University)

“The human face of climate change: Adaptation in a vulnerable coastal community context”

Other partners

Abi Beatson (PhD student, Victoria University)

“New media, information sharing and crisis mapping: An analysis of new media based information sharing practices during the Christchurch Earthquakes”.

Gill Scrymgeour (PhD student, University of Tasmania)

“Creating a resilient nursing workforce to the effects of large scale natural disasters within healthcare facilities within the South Pacific”.

Heather Craig (PhD student, Department of Geological Sciences, University of Canterbury)

“Volcanic ash impacts to agriculture”.

Sarah Beaven (PhD student, Department of Geological Sciences, University of Canterbury)

“Science and operational response partnerships after the Canterbury Earthquakes: a model facilitating research and operational collaboration”.

Daniel Blake (PhD student, Department of Geological Sciences, University of Canterbury)

“Ground Transportation fragility to volcanic hazards in Auckland”.

Josh Hayes (MSc student, Department of Geological Sciences, University of Canterbury)

“Pyroclastic Deposit Clean Up in Auckland: a geospatial risk assessment”.

Daniel Hill (MSc student, Department of Geological Sciences, University of Canterbury)

“Temporary power generation vulnerability to volcanic ash fall hazards”.

Emily Lambie (MSc student, Department of Geological Sciences, University of Canterbury)

“Human behaviour during strong earthquake shaking: CCTV analysis”.

Tom Robinson (PhD student, Department of Geological Sciences, University of Canterbury)

“Planning for a Great Alpine fault earthquake: Consequences for the South Island, New Zealand”.

Shaun Williams (PhD student, Department of Geological Sciences, University of Canterbury)

“Tsunami hazards, Samoa Islands: Palaeo-tsunami investigation, numerical source modelling and risk implications”.

Grant Wilson (PhD student, Department of Geological Sciences, University of Canterbury)

“Critical Infrastructure Fragility to Volcanic Hazards in Auckland”.

Katherine Yates (MSc student, Department of Geological Sciences, University of Canterbury)

“Geotechnical Risk Assessment response to seismic hazards in hilly terrain”.

Daniel Hogg (PhD student, Department of Geography, University of Canterbury)

“Geographic variations in natural disaster impacts and spatial links to non-injury related health outcomes”.

Vivienne Bryner (PhD student, Centre for Science Communication & Geology, University of Otago)

“Communication of geoscience knowledge to achieve disaster risk reduction”.

Steve Ronoh (PhD student, School of Environment, University of Auckland)

“Children with disabilities and disaster in NZ”.

Loic Le Dé (PhD student, School of Environment, University of Auckland)

“Migration, remittances and disaster in Samoa”.

Sushma Shrestha (PhD student, School of Environment, University of Auckland)

“Post-small disaster recovery in Nepal”

Rachael Boswell (PhD student, School of Environment, University of Auckland)

“Arts, artists and post-disaster recovery in Christchurch, NZ”.

Sokcheng Chhour (MSc student, School of Environment, University of Auckland)

“Gender and disaster in Cambodia”.

Alice McSherry (MSc student, School of Environment, University of Auckland)

“Food, health and livelihoods in the Marshall Islands”.

Katherine Hore (Hons student, School of Environment, University of Auckland)
“Children’s participation in environmental management in Kiribati”.

Megan Rickerby (Hons student, School of Environment, University of Auckland)
“Homelessness and disasters in NZ”.

Kate Boersen (Hons student, School of Environment, University of Auckland)
“Community recovery following the 1931 disaster in Hawke’s Bay, NZ”.

Anthony Gampell (Hons student, School of Environment, University of Auckland)
“Video games and disasters”.

Madeline Schelling (BSc student, School of Environment, University of Auckland)
“Food security and indigenous knowledge”.

Mary Anne Thompson (PhD student, School of Environment, University of Auckland)
“The interface between probabilistic hazard and risk assessment and volcanic risk and crisis management”.

Katelyn Rossiter (PhD student, School of Psychology, University of Tasmania)
“Natural disasters risk reduction using social media: Development of an evidence- community engagement model”.

Mel Irons (PhD student, School of Psychology, University of Tasmania)
“The role of social media and crowdsourcing in facilitating spontaneous volunteerism and community-led crisis communication, response and recovery”.

New publications

Becker, J. S., Paton, D., Johnston, D. M., Ronan, K. R. (in press). Societal influences on earthquake information meaning-making and household preparedness. *International Journal of Mass Emergencies and Disasters*.

Doyle E. E. H., McClure, J., Paton, D., Johnston, D. M. (2014). Uncertainty and decision making: Volcanic crisis scenarios. *International Journal of Disaster Risk Reduction*. In Press: accepted July 2014.

Fraser, S.A., Wood, N.J., Johnston, D., Leonard, G.S., Greening, P., Rossetto, T. 2014. Variable population exposure and distributed travel speeds in least-cost tsunami evacuation modelling. *Natural Hazards and Earth System Sciences Discussions*. 2, 4163-4200, DOI: 10.5194/nhessd-2-4163-2014.

Coomer, M. A.; Doyle, E. E. H.; Johnston, D. M.; Becker, J. S.; Fraser, S. A.; Johal, S.; Leonard, G. S.; Potter, S. H.; McClure, J.; Wright, K. C. 2014. Cook Strait Earthquakes: Survey on reactions of Wellington residents to the Cook Strait earthquake sequence, GNS Science Report 2014/41. 57 p. + Appendix

Lawrence, J., Quade, D., Becker, J. (in press). Integrating the effects of flood experience on risk perception with responses to changing climate risk. *Natural Hazards*.

Johnson, V.A., Kevin R. Ronan, K.R., Johnston, D.M., Peace, R. (2014). Evaluations of disaster education programs for children: A methodological review. *International Journal of Disaster Risk Reduction* 9: 107–123.

Johnson, V. A., Johnston, D. M., Ronan, K. R., & Peace, R. (in press). Evaluating children’s learning of adaptive response capacities from ShakeOut, an earthquake and tsunami drill in two Washington state school districts. *Journal of Homeland Security and Emergency Management*.

Johnson, V.A., Kevin R. Ronan, K.R., Johnston, D.M., Peace, R. (in press). Implementing disaster preparedness education in New Zealand primary schools. *Disaster Prevention and Management*.

Johnston, D., Standring, S., Ronan, K., Lindell, M., Wilson, T., Cousins, J., Aldridge, E., Ardagh, M., Deely, J., Jensen, S., Kirsch, T., Bissell, R. (2014 in press). The 2010/2011 Canterbury Earthquakes: context and cause of injury. *Natural Hazards*.

Johnston, D., Standring, S., Ronan, K., (2014) Children’s understanding of natural hazards in Christchurch: reflecting on a 2003 study. *Australian Journal of Emergency Management* 29: 66.

- Kenney, C. (2014). Māori Approaches to Disaster Risk Reduction and Community Resilience - A Framework for Action? New Directions in Disaster Recovery and Reconstruction: Livelihoods, Resilience and Sustainability International Conference. Pingtung National University of Science and Technology, Kaohsiung, Taiwan, 9-12 June, 2014.
- King, A., Middleton, D., Brown, C., Johnston, D., Johal, S. (2014) Insurance: Its Role in Recovery from the 2010–2011 Canterbury Earthquake Sequence. *Earthquake Spectra*: February 2014, Vol. 30, No. 1, pp. 475-491. doi: <http://dx.doi.org/10.1193/022813EQS058M>.
- Paton, D., Johnston, D., Mamula-Seadon, L & Kenney, C.M. (2014) Recovery and Development: Perspectives from New Zealand and Australia. In Kapucu, N. & Liou, K. T. (Eds). *Disaster & development: Examining global issues and cases*. New York, NY: Springer.
- Paton, D. & Norris, K. (2014) Vulnerability to Work-Related Posttraumatic Stress: Family and Organizational Influences. In J.M. Violanti (ed) *Dying for the Job: Police Work Exposure and Health*. Springfield, Ill.: Charles C. Thomas.
- Potter, S. H., Jolly, G. E., Neall, V. E., Johnston, D. M., & Scott, B. J. (2014). Communicating the status of volcanic activity: Revising New Zealand's Volcanic Alert Level system. *Journal of Applied Volcanology*, special issue on Emergency Management (in press, accepted August 2014).
- Phibbs, S., Good, G., Severinsen, C., Woodbury, E. & Williamson, K. (2014) Emergency Preparedness and Perceptions of Vulnerability among Disabled People Following the Christchurch Earthquakes: Applying lessons learnt to the Hyogo Framework for Action. Full Paper in Conference Proceedings. Integrated Disaster Risk Science: A Tool for Sustainability. IRDR Conference International Conference Centre, 7-9 June, Beijing, China.
- Prasanna, R., Yang, L., & Malcolm, K. (2014). Sensor networks supporting fire emergency response. *Asia Pacific Broadcasting Union Technical Review*, 258(2), 8-13.
- Rovins, J. E., Doyle, E. E. H. and Huggins, T. J. (2014): 2nd Integrated Research on Disaster Risk Conference - Integrated Disaster Risk Science: A tool for sustainability. In: *Planet@Risk*, 2(5), Special Issue for the Post-2015 Framework for DRR: p. 332-336, Global Risk Forum GRF Davos, Davos.
- Saunders, W. S. A.; Beban, J. G.; Coomer, M. A. 2014. Analysis of natural hazard provisions in regional policy statements, territorial authority plans, and CDEM Group Plans, GNS Science Report 2014/28. 70 p.
- Saunders, W. S. A.; Beban, J. G. 2014. Petone Plan Change 29: An example of science influencing land use planning policy, GNS Science Report 2014/23. 56 p.
- Saunders, W. S. A.; Beban, J. G.; Taig, T., Morris, B.; Mieler, D. H.; Massey, C. I. 2014. Case studies on national and international approaches to risk reduction through land use planning, GNS Science Report 2014/46. 67 p
- Scott, B. J., Potter, S. H. (in press). Aspects of historical eruptive activity and volcanic unrest at Mt. Tongariro, New Zealand: 1846-2013. *Journal of Volcanology and Geothermal Research* (Special issue: Tongariro Eruption 2012), available online.
- Sword-Daniels, V., Wilson, T. M., Sargeant, S., Rossetto, T., Twigg, J., Johnston, D. M., Loughlin, S. C., and Cole, P. D. 2014. "Consequences of Long-Term Volcanic Activity for Essential Services in Montserrat: Challenges, Adaptations and Resilience." Pp. 471–88 in *The eruption of Soufriere Hills Volcano, Montserrat from 2000 to 2010*, vol. 39, edited by G Wadge, R E A Robertson, and B Voight. London: Geological Society of London Memoirs. <http://dx.doi.org/10.1144/M39.26>.
- Tarrant, R. (2014). Leadership and Faith in a School Tragedy: A School Principal's Perspective. *Psychology*, 5(5), 413-420.
- Tuohy, R., Stephens, C., & Johnston, D. (2014). Qualitative research can improve understandings about disaster preparedness for independent older adults in the community. *Disaster Prevention and Management* 23:296-308.
- Webb, M. & Ronan, K.R. (2014). Interactive hazards education program in a low SES community : A quasi-experimental pilot study. *Risk Analysis*: in press.
- Williamson, K. (2014) (supervised by Suzanne Phibbs) Negotiating recovery from alcoholism in the context of the Canterbury earthquakes. A thesis submitted to Massey University in partial fulfilment of the requirements for a Master in Philosophy. Palmerston North: Massey University. 148 pages.

Upcoming Events

3rd International Conference on Urban Disaster Reduction

“Sustainable Disaster Recovery: Addressing Risks and Uncertainty”

September 28 - October 1, 2014
Hotel Boulderado, Boulder, Colorado, USA

The 3rd International Conference on Urban Disaster Reduction (3ICUDR) builds on an established practice of international collaboration and knowledge-sharing after disaster events in Japan, US, and Taiwan. In this third conference, New Zealand joins the three collaborating countries. The mission of the conference is to develop, integrate and promote new knowledge and best practices in sustainable disaster recovery, with a particular emphasis on urban environments.

Call for Abstracts

Abstracts are solicited on topics related to disaster recovery and urban disaster reduction. Reviewers will be looking for abstracts that take bold steps in describing new strategies and ways of thinking to significantly reduce potential casualties, damage, and disruption from future disasters, and create safe, resilient, and adaptive communities, regions, and nations. Young scholars are encouraged to present emerging research.

Papers that bridge the knowledge gaps between research and practice are particularly welcome.

Broad topic areas may include, but are not limited to:

- Unique challenges and opportunities for recovery in urban environments
- New theorizing of sustainable recovery across local, regional, and national contexts
- Comparisons and contrasts of sustainability measures used in recovery across the four countries
- Influences on and effects of recovery outcomes (political, economic, cultural, organizational, and environmental)
- Differential vulnerability and capacity in sustainable disaster recovery
- Recovery planning and implementation under uncertainty
- Linkages between disaster recovery and other stages of disaster, such as mitigation or adaptation
- Public and private investment for resilient infrastructure
- Recovery planning for emerging crises that do not adhere to our current understandings of disaster
- Resolving conflicts between sustainable recovery and post disaster risk management

Abstract Requirements:

Abstracts should be 1 page single-spaced and be submitted through the conference's online system at: <https://www.eeri.org/cohost/registration/3icudr-abstract-submission>

SUBMISSION DEADLINE: MAY 1, 2014

Notification of Acceptance will be given in June 2014.

Accepted presenters will be required to submit a 4-5 page, single-spaced paper by **August 15th, 2014**.

A limited number of travel grants will be available for young researchers and practitioners.

For more information about the call for abstracts or the conference, visit <http://3icudr.org>

Sponsoring Organizations

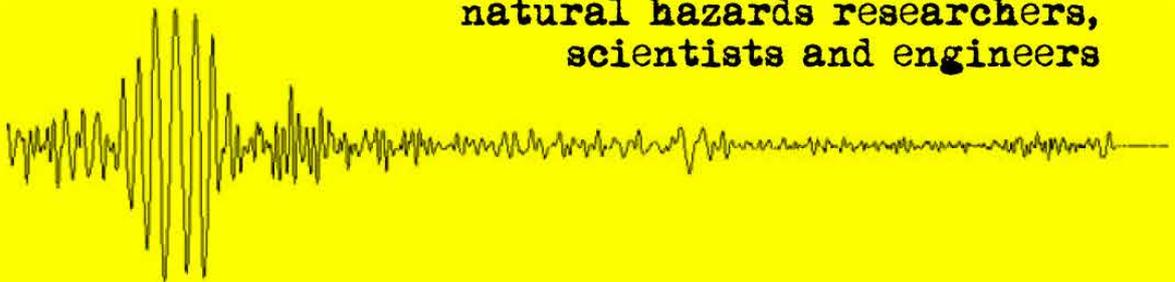
The 3ICUDR is being organized by the Earthquake Engineering Research Institute with funding from the Japan Foundation Center for Global Partnership.



c/o Natural Hazards Center • University of Colorado • 1440 15th Street • Boulder, CO 80302, USA • T: (303) 492-6818 • F: (303) 492-2151 • hazctr@colorado.edu
c/o Earthquake Engineering Research Institute • 499 14th Street, Suite 220 • Oakland, CA 94612-1934, USA • T: (510) 451-0905 • F: (510) 451-5411 • eeri@eeri.org

Media, Disasters and the Public

A communications workshop for
natural hazards researchers,
scientists and engineers



Communicating vital information to the public during disasters is an essential, but sometimes daunting, responsibility for scientists and engineers.

This workshop will cover a range of practical and research-based insights into the effective science communication for different audiences, including media and members of the public.

Date: Friday, 10 October 2014

Time: 9:00 – 5:00 p.m.

Location: Royal Society Lecture Theatre,
11 Turnbull Street, Wellington

More info & registration: sciencemediacentre.co.nz/disasters

NHRP

Natural Hazards Research Platform



MASSEY UNIVERSITY
TE KUNENGA KI PŪREHURŌA
UNIVERSITY OF NEW ZEALAND



RISK NZ

7TH NATIONAL CONFERENCE ON RISK MANAGEMENT



SEIZE THE DAY

stepping forward in challenging times

Date: 23 & 24 Oct 2014

Pre-Conference Workshop: 22 Oct 2014

Venue: Te Papa, Wellington

Website: www.risksociety.org.nz

REGISTRATION FEE

Earlybird Registration
From 1 May to 31 August 2014

Member Earlybird:
\$885.00 (\$769.57+gst)

Non Member Earlybird:
\$1,000.00 (\$869.57+gst)

PMINZ Member Earlybird:
\$942.50(\$819.56+gst)

Premier Sponsor:



WYNYARD™

Earlybird Registration
Deadline – 31 August 2014

REGISTER NOW www.risksociety.org.nz

Dead Weight or Dead Right?

Have your say and join us for the Regulatory Panel Debate on day two where our Executive Group debates whether New Zealand's complex regulatory environment is finding the right balance.

2014 annual conference of the Sociological Association of Aotearoa New Zealand, 4th - 5th December 2014, Christchurch

“The social impact of the Canterbury earthquakes”

Dear friends and colleagues, welcome to the 2014 SAANZ annual conference. This SAANZ conference has a Groundhog Day feel to it – four years ago we were in the middle of organising



the 2010 conference when plans were derailed by the beginning of the Canterbury earthquakes. We are now back in the position to offer you a conference that, we hope, will give you an opportunity to share your work with others yet also enable you to engage with the social consequences of our city's quake experiences. While the call for

papers is a general one, the keynotes are leaders in the field of disaster sociology. Given the particular context for the conference – taking place in a rebuilding city where accommodation and transport are heavily utilised by rebuild workers, we have kept conference registration costs as low as possible. To encourage you to book early, abstract submissions and registration details are available from the 1st May, 2014. We will process abstracts as soon as possible to facilitate your planning. Conference team: Ruth McManus (co-ordinator), Rochelle Bloy, Denise Forbes, Lyndon Fraser, Mike Grimshaw, Alison Loveridge, Greg Newbold, Anne Scott, Tiina Vares. Conference email: saanz2014conference@canterbury.ac.nz

PLANNING FOR A VOLCANIC CRISIS

Suncourt Hotel, Taupo

20–21 October 2014

Taupo Supervolcano Field Trip (optional)
22 October 2014

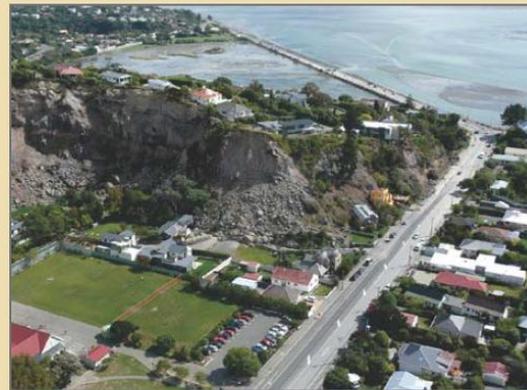


JOINT CENTRE FOR DISASTER RESEARCH
School of Psychology, Massey University
and GNS Science

EMERGENCY MANAGEMENT Summer Institute

Massey University Campus,
Wellington, New Zealand

2 - 6 March, 2015



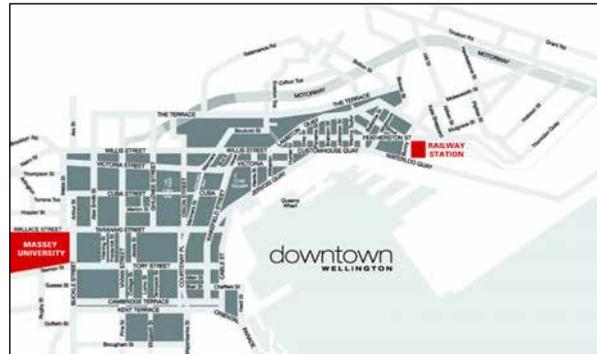
Rockfalls near Redcliffs School, Christchurch, initiated by the 22 February 2011 earthquake and subsequent aftershocks.
Photo: GNS Science



For more information on the short course email Daryl Baron – d.barton@gns.cri.nz

Location

The centre is part of the School of Psychology, in the College of Humanities & Social Sciences. The centre Director, staff and students are based at the Massey University campus in Wellington (Building T20). However, the centre draws on staff from other Massey campuses, GNS Science and other collaborating organisations. Visits to the centre are welcomed but by appointment only please.



Contact Details

Joint Centre for Disaster Research,
GNS Science/Massey University,
PO Box 756, Wellington 6140,
New Zealand
Ph: + 64 4 570 1444 Fax: + 64 4 801 4822
jcdr.enquiry@massey.ac.nz

